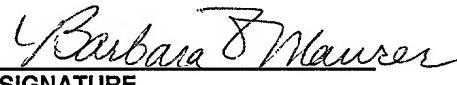


FORM PTO-1390 (REV. 11-2000) U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE		ATTORNEY DOCKET NUMBER AM100246-00	
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371		U.S. APPLICATION NO (IF KNOWN SEE 37 CFR 1.5) 10/019481	
INTERNATIONAL APPLICATION NO. PCT/US 00/17895	INTERNATIONAL FILING DATE June 28, 2000		PRIORITY DATE CLAIMED July 5, 1998
TITLE OF INVENTION: ANT Controllers and Method for Application Thereof			
APPLICATION(S) FOR DO/EO/US: Takagi, Kazuhiro, et al.			
<p>Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:</p> <ol style="list-style-type: none"> 1. <input checked="" type="checkbox"/> This is a FIRST submission of items concerning a filing under <u>35 U.S.C. 371</u>. 2. <input type="checkbox"/> This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371. 3. <input type="checkbox"/> This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include the items (5), (6), (9) and (21) indicated below. 4. <input checked="" type="checkbox"/> The US has been elected by the expiration of 19 months from the priority date (Article 31). 5. <input checked="" type="checkbox"/> A copy of the International Application as filed (35 U.S.C. 371(c)(2)) <ol style="list-style-type: none"> a. <input checked="" type="checkbox"/> is attached hereto (required only if not communicated by the International Bureau). b. <input type="checkbox"/> Has been communicated by the International Bureau. c. <input type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US). 6. <input type="checkbox"/> An English language translation of the International Application as filed (35 U.S.C. 371(C)(2)). <ol style="list-style-type: none"> a. <input type="checkbox"/> is attached hereto. b. <input type="checkbox"/> Has been previously submitted under 35 U.S.C. 154(d)(4). 7. <input checked="" type="checkbox"/> Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)) <ol style="list-style-type: none"> a. <input checked="" type="checkbox"/> are attached hereto (required only if not communicated by the International Bureau). b. <input type="checkbox"/> have been communicated by the International Bureau. c. <input type="checkbox"/> have not been made; however, the time limit for making such amendments has NOT expired. d. <input type="checkbox"/> have not been made and will not be made 8. <input checked="" type="checkbox"/> An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)). 9. <input type="checkbox"/> An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)). 10. <input type="checkbox"/> An English language translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)). <p>Items 11. to 20 below concern other document(s) or information included:</p> <ol style="list-style-type: none"> 11. <input type="checkbox"/> An Information Disclosure Statement under 37 CFR 1.97 and 1.98. 12. <input checked="" type="checkbox"/> An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included 13. <input type="checkbox"/> A FIRST preliminary amendment. 14. <input type="checkbox"/> A SECOND or SUBSEQUENT preliminary amendment. 15. <input type="checkbox"/> A substitute specification. 16. <input type="checkbox"/> A Change of power of attorney and/or address letter. 17. <input type="checkbox"/> A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825. 18. <input type="checkbox"/> A second copy of the published international application under 35 U.S.C. 154(d)(4). 19. <input type="checkbox"/> A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4). 20. <input type="checkbox"/> Other items or information: 			

U.S. APPLICATION NO. (If known see 37 C.F.R. 1.5) 10/019481		INTERNATIONAL APPLICATION NO. PCT/US00/17895		ATTORNEY'S DOCKET NUMBER AM100246-00
21. <input checked="" type="checkbox"/> The following fees are submitted:				CALCULATIONS PTO USE ONLY
Basic National Fee (37 CFR 1.492(a)(1)-(5)): Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO.....		\$1040.00		
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO.....		\$890.00		
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO.....		\$740.00		
International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4).....		\$710.00		
International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4)		\$100.00		
ENTER APPROPRIATE BASIC FEE AMOUNT =				\$740.00
Surcharge of \$130.00 for furnishing the oath or declaration later than months from the earliest claimed priority date (37 CFR 1.492(e)).		20	<input checked="" type="checkbox"/>	30
				\$
CLAIMS	Number Filed	Number Extra	Rate	
Total claims	19 - 20 =	0	X \$18.00	\$0.00
Independent claims	1 - 03 =	0	X \$80.00	\$0.00
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ \$270.00	\$270.00
TOTAL OF ABOVE CALCULATION =				\$0.00
<input type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by 1/2.			+ \$	
SUBTOTAL =				\$1010.00
Processing fee of \$130.00 for furnishing the English translation later than months from the earliest claimed priority date (37 CFR 1.492(f)).		20	<input type="checkbox"/>	30
				\$
TOTAL NATIONAL FEE =				\$1010.00
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property			+ \$	\$40.00
TOTAL FEES ENCLOSED =				\$0.00
				Amount to be: Refunded
				Charged
				\$1,050.00
a. <input type="checkbox"/> A check in the amount of \$_____ to cover the above fees is enclosed.				
b. <input checked="" type="checkbox"/> Please charge my Deposit Account No. <u>02-1197</u> in the amount of <u>\$1050.00</u> to cover the above fees A duplicate copy of this sheet is enclosed.				
c. <input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. <u>02-1197</u> . A duplicate copy of this sheet is enclosed.				
d. <input type="checkbox"/> Fees are to be charged to a credit card. WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.				
NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.				
SEND ALL CORRESPONDENCE TO: BASF CORPORATION Patent Department 3000 Continental Drive - North Mount Olive, New Jersey 07828-1234 (973) 426-3293		 SIGNATURE <u>Barbara V. Maurer</u> Name _____ 31.278 REGISTRATION NUMBER _____		

JC13 Rec'd PCT/PTO 31 DEC 2001

ANT CONTROLLERS AND METHOD FOR
APPLICATION THEREOF

5

BACKGROUND OF THE INVENTION

FIELD OF THE INVENTION

The present invention relates to novel ant controller containing a hydrazine derivative as an active ingredient and to a method for application of the ant controller.

RELATED ART

The hydrazine derivatives represented by the formula (I) which can be used as active ingredient of the ant controllers of the present invention are known compounds disclosed in JP-A-5-4958, JP-A-5-17428, JP-A-5-32603, JP-A-5-262712, etc. In these patents, it is described that these derivatives have an insecticidal activity as agrihorticultuarl insecticides against LEPIDOPTERA such as diamondback moth, rice leafroller, etc., HEMIPTERA such as tea green leafhopper, pear lace bug, etc., COLEOPTERA such as twenty-eight-spotted ladybird, maize weevil, etc., DIPTERA such as melon fly, house fly, house mosquito, etc., and TYLENCHIDA such as coffee root-lesion nematode, root-knot nematode, etc.

Any of these patent gazettes, however, does neither describe nor suggest that said hydrazine derivatives have a marked insecticidal effect against

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5 ISOPTERA such as formosan subterranean termite, kolbe,
etc., HYMENOPTERA such as cabbage sawfly, Carpenter ant,
etc., ORTHOPTERA such as Japanese cockroach, field
cricket, rice grasshopper, etc., and PSOCOPTERA such as
large pale booklouse, etc.

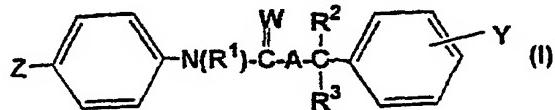
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SUMMARY OF THE INVENTION

The present inventors have conducted extensive studies with the aim of creating a novel ant controller having a marked controlling effect upon ants doing harm to the wooden materials constituting houses, furniture, 15 etc. or crops and human being. As a result, it has been found that some of the hydrazine derivatives described in the above-mentioned prior art have a marked insecticidal effect upon termites and ants. The present invention has been accomplished on the basis of this 20 findings.

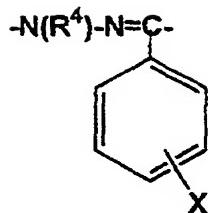
DETAILED DESCRIPTION OF THE INVENTION

The present invention relates to ant controllers containing as active ingredient thereof a hydrazine derivative represented by the following 25 formula (I) and method for application of the ant controllers:

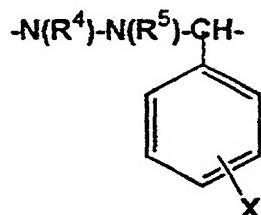


wherein A represents:

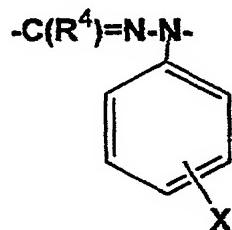
- 3 -



5 (wherein R⁴ represents hydrogen atom or C₁-C₆ alkyl group, and X represents 1 to 5, same or different substituents selected from the group consisting of hydrogen atom, halogen atom, C₁-C₆ alkyl group and halo C₁-C₆ alkyl group),

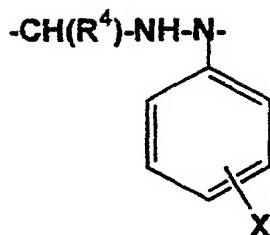


10 (wherein R⁴ and X are as defined above, and R⁵ represents hydrogen atom, C₁-C₆ alkylcarbonyl group or phenylcarbonyl group which may have 1 to 2, same or different substituents selected from the group consisting of C₁-C₆ alkyl groups),



(wherein R⁴ and X are as defined above), or

- 4 -



(wherein R⁴ and X are as defined above);

5 R¹ represents hydrogen atom or C₁-C₆ alkyl group;

10 R² and R³, which may be same or different, represent hydrogen atom, hydroxyl group, C₁-C₆ alkyl group, C₁-C₆ alkoxy group, C₁-C₆ alkylcarbonyl group or phenylcarbonyl group;

15 Y represents 1 to 5, same or different substituents selected from the group consisting of hydrogen atom, halogen atom, nitro group and cyano group;

20 Z represents halogen atom, cyano group, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, halo C₁-C₆ alkylthio group, halo C₁-C₆ alkylsulfinyl group or halo C₁-C₆ alkylsulfonyl group; and

25 W represents oxygen atom or sulfur atom.

The ant controller of the present invention is an excellent ant controller for protecting wooden materials such as trees, board fences, sleepers, etc. and buildings such as shrines, temples, houses, outhouses, factories, etc. from ants such as termites, and for controlling ants doing harm to crops or human being.

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5 In the definition of the formula (I) shown
above, the term "halogen atom" means chlorine atom,
bromine atom, iodine atom and fluorine atom; the term
"C₁-C₆ alkyl" means a straight or branched chain alkyl
group having 1 to 6 carbon atoms; and the term "halo C₁-
10 C₆ alkyl" means an alkyl group having 1 to 6 carbon atoms
substituted with at least one, same or different halogen
atoms.

Preferable examples of the hydrazine
derivative represented by the formula (I) of the present
15 invention are the hydrazine derivatives represented by
the formulas (I-1) and (I-2) as mentioned below.

Preferable examples of each substituent of the hydrazine
derivatives of formulas (I-1) and (I-2) are the
compounds wherein W is oxygen atom, X is trifluoromethyl
20 group, Y is cyano group, Z is trifluoromethoxy group,
and each of R¹, R², R³ and R⁴ is simultaneously a hydrogen
atom. More preferable examples are the compounds
wherein X is substituted on the 3-position, and Y is
substituted on the 4-position of the phenyl ring.

25 Most preferable example is the hydrazine
derivative represented by the formula (I-1), wherein
each of R¹, R², R³ and R⁴ is simultaneously a hydrogen
atom, X is trifluoromethyl group substituted on the 3-
position of the phenyl ring, Y is cyano group
30 substituted on the 4-position of the phenyl ring, and Z
is trifluoromethoxy group.

Typical examples of the hydrazine derivative

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5 represented by the formula (I) used as an active
ingredient of the ant controller of the present
invention are shown in Table 1 to Table 4, but the
present invention is by no means limited to the
compounds exemplified herein.

LITERATUR

Formula (I-1)

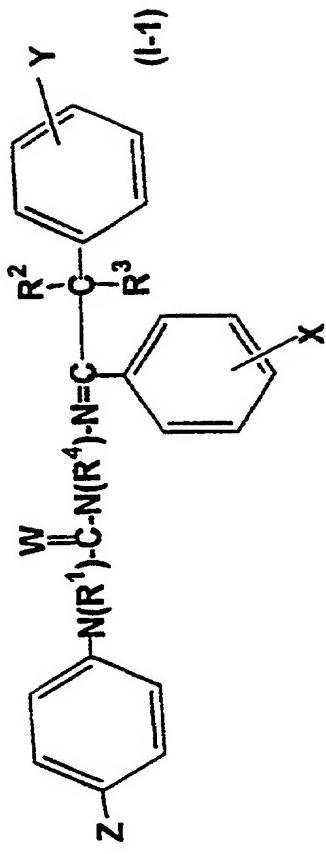


Table 1

No.	R ¹	R ²	R ³	R ⁴	X	Y	Z	W	mp (°C)
1	H	H	H	H	H	H	C1	O	199
2	H	H	H	H	H	H	OCF ₃	O	149
3	H	H	H	H	H	4-Cl	C1	O	206
4	H	H	H	H	H	4-Cl	OCF ₃	O	197
5	H	H	H	H	H	4-CN	C1	O	217
6	H	H	H	H	H	4-CN	C1	S	128
7	H	H	H	H	H	4-CN	OCF ₃	S	116

Table 1 (Cont'd)

No.	R ¹	R ²	R ³	R ⁴	X	Y	Z	W	mp °C
8	H	H	H	H	4-CN	OCF ₃	O	O	214
9	H	H	H	H	4-CN	OCF ₃	O	O	E-form 159
									Z-form
10	H	H	H	H	4-NO ₂	C1	O	O	222
11	H	H	H	H	4-NO ₂	C1	S	S	206
12	H	H	H	H	4-NO ₂	OCF ₃	O	O	189
13	H	H	H	H	4-NO ₂	OCF ₃	S	S	139
14	H	H	H	H	4-NO ₂	SCF ₃	O	O	200
15	H	H	H	H	H	OCF ₃	O	O	212
16	H	H	H	H	3-C1	4-C1	OCF ₃	O	201
17	H	H	H	H	3-C1	4-CN	C1	O	206

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Table 1 (Cont'd)

No.	R ¹	R ²	R ³	R ⁴	X	Y	Z	W	mp. O
18	H	H	H	H	3-C1	4-CN	OCF ₃	0	187
19	H	H	H	H	3-C1	4-CN	OCF ₃	0	148
20	H	H	H	H	3-C1	4-CN	OCF ₃	S	199
21	H	H	H	H	3-C1	4-CN	SCF ₃	0	215
22	H	H	H	H	3-C1	4-CN	SOCF ₃	0	205
23	H	H	H	H	3-C1	4-CN	SO ₂ CF ₃	0	212
24	H	H	H	H	3-Br	H	C1	0	191
25	H	H	H	H	3-Br	H	OCF ₃	0	209
26	H	H	H	H	3-Br	4-CN	C1	0	205
27	H	H	H	H	3-Br	4-CN	OCF ₃	0	176
28	H	H	H	H	3-Br	4-CN	SCF ₃	0	206

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Table 1 (Cont'd)

No.	R ¹	R ²	R ³	R ⁴	X	Y	Z	W	mp. °
29	H	H	H	H	3-Br	4-CN	SOCF ₃	0	216
30	H	H	H	H	3-Br	4-CN	SO ₂ CF ₃	0	215
31	H	H	H	H	3-F	H	C1	0	206
32	H	H	H	H	3-F	H	OCF ₃	0	200
33	H	H	H	H	3-F	4-Cl	OCF ₃	0	191
34	H	H	H	H	3-F	4-Cl	C1	0	208
35	H	H	H	H	3-F	4-CN	OCF ₃	0	202
36	H	H	H	H	3-I	4-CN	C1	0	213
37	H	H	H	H	3-I	4-CN	OCF ₃	0	201
38	H	H	H	H	3-CH ₃	H	C1	0	185
39	H	H	H	H	3-CH ₃	H	OCF ₃	0	198
40	H	H	H	H	3-CH ₃	4-CN	C1	0	200
41	H	H	H	H	3-CH ₃	4-CN	OCF ₃	0	189

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Table 1 (Cont'd)

No.	R ¹	R ²	R ³	R ⁴	X	Y	Z	W	mp °
42	H	H	H	H	3-CF ₃	H	C1	0	206
43	H	H	H	H	3-CF ₃	H	OCF ₃	0	210
44	H	H	H	H	3-CF ₃	4-CN	OCF ₃	0	191
45	H	H	H	H	3-CF ₃	4-CN	OCF ₃	S	149
46	CH ₃	H	H	H	H	H	C1	0	132
47	CH ₃	H	H	H	H	H	OCF ₃	0	108
48	H	CH ₃	H	H	H	H	C1	0	98
49	H	CH ₃	H	H	H	H	Br	0	85
50	H	CH ₃	H	H	H	H	OCF ₃	0	115
51	H	CH ₃	H	H	H	H	OCF ₃	0	95
52	H	CH ₃	H	H	H	H	OCF ₃	0	66
							EZ-form		Z-form

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Table 1 (Cont'd)

Table 1 (Cont'd)

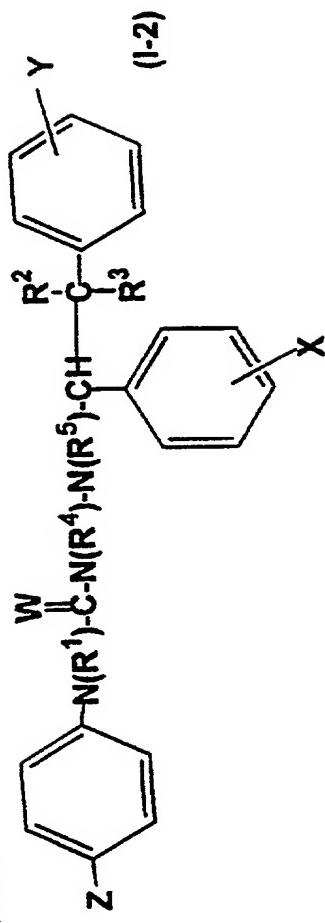
No.	R ¹	R ²	R ³	R ⁴	X	Y	Z	W	mp °C
66	H	H	OCH ₃	H	H	H	C1	0	183
67	H	H	OCH ₃	H	H	H	OCF ₃	0	181
68	H	H	OC ₃ H ₇ -i	H	H	H	C1	0	155
69	H	H	OC ₃ H ₇ -i	H	H	H	OCF ₃	0	193
70	H	H	OC ₃ H ₉ -i	H	H	H	C1	0	176
71	H	H	OC ₄ H ₉ -i	H	H	H	OCF ₃	0	184
72	H	H	O-CO-CH ₃	H	H	H	OCF ₃	0	182
73	H	H	O-CO-Ph	H	H	H	OCF ₃	0	168
74	H	H	OH	CH ₃	H	H	C1	0	115
75	H	H	OH	CH ₃	H	H	OCF ₃	0	130
76	H	H	H	H	3-F	4-CN	SCF ₃	0	214
77	H	H	H	H	3-F	4-CN	SOCF ₃	0	214
78	H	H	H	H	4-F	4-CN	SO ₂ CF ₃	0	165
79	H	H	H	H	3-Cl	4-CN	SOCF ₃	0	157

Table 1 (Cont'd)

No.	R ¹	R ²	R ³	R ⁴	X	Y	Z	W	mp °C
80	H	H	H	H	3-CF ₃	4-CN	SCF ₃	0	215
81	H	H	H	H	3-CF ₃	4-CN	SOCF ₃	0	210
82	H	H	H	H	3-CF ₃	4-CN	OCF ₃	0	152
83	H	H	H	H	3-CF ₃	4-CN	C1	0	165

Note: Ph is phenyl group.

Formula (I-2)

Table 2 (R¹ and R³ are hydrogen atoms)

No.	R ²	R ⁴	R ⁵	X	Y	Z	W	mp (°C)
84	H	H	H	H	H	C1	O	211
85	H	H	H	H	H	OCF ₃	O	194
86	H	H	H	H	4-Cl	OCF ₃	O	209
87	H	H	H	H	4-CN	OCF ₃	O	204
88	H	H	H	H	4-NO ₂	OCF ₃	O	203
89	H	H	H	3-F	4-Cl	OCF ₃	O	203
90	H	H	H	3-Cl	4-Cl	OCF ₃	O	176

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Table 2 (Cont'd)

No.	R ²	R ⁴	R ⁵	X	Y	Z	W	mp °C
91	H	H	H	3-C1	4-CN	OCF ₃	0	193
92	H	H	H	3-C1	4-CN	SCF ₃	0	177
93	H	H	H	3-C1	4-CN	SO ₂ CF ₃	0	178
94	H	H	H	3-C1	4-CN	SO ₂ CF ₃	0	170
95	H	H	H	3-Br	4-CN	OCF ₃	0	187
96	H	H	H	3-CF ₃	4-CN	OCF ₃	0	165
97	H	H	H	3-CF ₃	4-CN	SCF ₃	0	164
98	H	H	H	H	4-C1	OCF ₃	S	171
99	H	H	H	3-C1	4-CN	OCF ₃	S	149
100	H	H	H	3-CF ₃	4-CN	OCF ₃	S	209
101	H	H	CO-CH ₃	3-C1	4-CN	OCF ₃	0	178
102	H	H	CO-Ph	3-C1	4-CN	OCF ₃	0	221

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Table 2 (Cont'd)

No.	R ²	R ⁴	R ⁵	X	Y	Z	W	mp [1]
103	H	H	CONHC ₂ H ₅	3-C1	4-CN	OCF ₃	O	201
104	H	OH	H	H	H	OCF ₃	O	190
105	H	OCH ₃	H	H	H	C1	O	195
106	H	OCH ₃	H	H	H	OCF ₃	O	183
107	H	OCH ₃	H	H	H	OCF ₃	O	186
108	CH ₃	H	H	3-C1	4-CN	OCF ₃	O	156
109	H	H	H	H	4-F	OCF ₃	O	209
110	H	H	H	H	4-Br	C1	O	233
111	H	H	H	H	4-Br	OCF ₃	O	201
112	H	H	H	H	3-CN	OCF ₃	O	176
113	H	H	H	H	2-NO ₂	OCF ₃	O	197
114	H	H	H	3-F	4-CN	OCF ₃	O	189

Table 2 (Cont'd)

No.	R ²	R ⁴	R ⁵	X	Y	Z	W	mp [1]
115	H	H	H	3-F	4-CN	SCF ₃	O	189
116	H	H	H	3-F	4-CN	SOCF ₃	O	166
117	H	H	H	3-CF ₃	4-CN	OCF ₃	O	131
						(-) -Isomer		
118	H	H	H	3-CF ₃	4-CN	OCF ₃	O	126
						(+) -Isomer		
119	H	H	H	3-CF ₃	4-CN	SOCF ₃	O	Glassy
120	H	H	H	3-CF ₃	4-CN	SO ₂ CF ₃	O	Glassy
121	H	H	H	H	3-CN	OCF ₃	O	120

Note: Ph is phenyl group.

Compounds 106 and 107 are diasteromers.

Compound 106 is higher than Compound 107 in the Rf value.

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5 Formula (I-3)

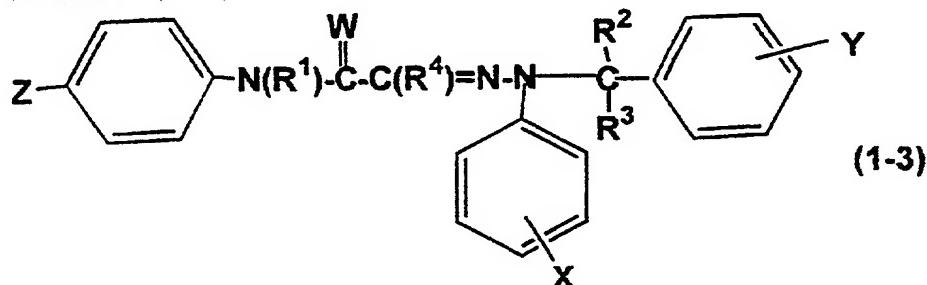


Table 3 (R² and R³ are hydrogen atoms, and W is oxygen atom.)

No	R ¹	R ²	X	Y	Z	mp °, Refractive index
122	H	H	H	H	OCF ₃	113.3-114.0
123	H	H	H	4-Cl	OCF ₃	137.8
124	H	H	H	4-CN	Cl	163
125	H	H	H	4-CN	OCF ₃	138
126	H	H	3-Cl	4-Cl	Cl	143.5-144.0
127	H	H	3-Cl	4-Cl	OCF ₃	139.6-141.5
128	H	H	3-Cl	4-NO ₂	Cl	174.0-176.5
129	H	H	3-Cl	4-NO ₂	OCF ₃	151.6-151.7
130	H	H	3-Cl	4-CN	Cl	191.0-192.0
131	H	H	3-Cl	4-CN	OCF ₃	160.5-162.0
132	H	H	3-Cl	4-CN	SCF ₃	188.0
133	H	H	3-Cl	4-CN	SOCF ₃	206.1
134	H	H	3-F	4-CN	Cl	154-156
135	H	H	3-F	4-CN	OCF ₃	155.9-156.8

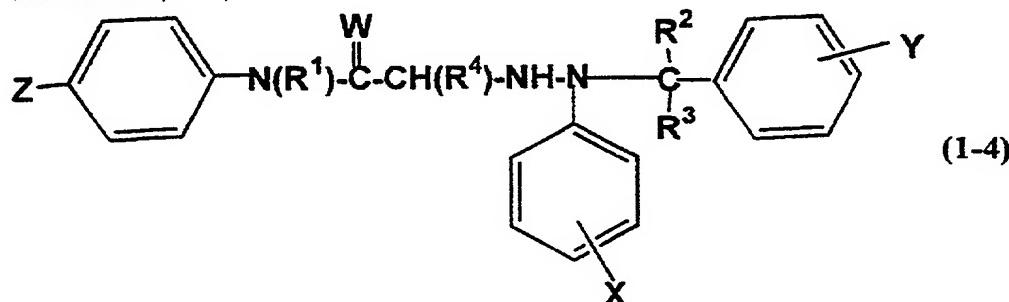
- 20 -

Table 3 (Cont'd)

No	R ¹	R ⁴	X	Y	Z	mp °C, Refractive index
136	H	H	3-CH ₃	4-CN	Cl	127
137	H	H	3-CH ₃	4-CN	OCF ₃	166
138	H	H	3-CF ₃	4-CN	Cl	164-165
139	H	H	3-CF ₃	4-CN	OCF ₃	151.0
140	H	CH ₃	3-Cl	4-CN	OCF ₃	nD 1.5950 (25°C)
141	CH ₃	H	3-CF ₃	4-CN	Cl	209-211
142	H	H	3-Cl	2-CN	OCF ₃	148

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Formula (I-4)

Table 4 (R^1 , R^2 , R^3 and R^4 are hydrogen atoms.)

No	X	Y	Z	mp \square , Refractive index
143	H	H	OCF ₃	51.0-53.0
144	H	4-Cl	OCF ₃	92.1
145	H	4-CN	Cl	106-108
146	H	4-CN	OCF ₃	nd 1.5685 (27 \square)
147	3-Cl	4-Cl	Cl	105.3-106.4
148	3-Cl	4-Cl	OCF ₃	38.0
149	3-Cl	4-NO ₂	Cl	Viscous
150	3-Cl	4-NO ₂	OCF ₃	Viscous
151	3-Cl	4-CN	Cl	153.1
152	3-Cl	4-CN	OCF ₃	43.5-45.0
153	3-F	4-CN	Cl	164-165
154	3-F	4-CN	OCF ₃	nd 1.5615 (27 \square)
155	3-CH ₃	4-CN	Cl	138-139
156	3-CH ₃	4-CN	OCF ₃	nd 1.5315 (28 \square)
157	3-CF ₃	4-CN	Cl	43
158	3-CF ₃	4-CN	OCF ₃	153.1

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Some of the compounds shown in Tables 1 to 4 are viscous or glassy substances. Their ¹H-NMR data are summarized in Table 5.

Table 5

No	¹ H-NMR [CDCl ₃ /TMS, δ (ppm)]
59	6.29 (s, 1H), 7.65-7.92 (m, 13H), 9.14 (bs, 1H), 10.70 (bs, 1H). (DMSO-d ₆)
62	3.88 (bs, 1H), 3.87 (s, 1H), 6.91-7.55 (m, 13H), 7.73 (s, 1H), 8.13 (bs, 1H).
119	3.12 (dd, 1H), 3.23 (dd, 1H), 4.12-4.32 (m, 2H), 6.13 (bs, 1H), 7.24-7.93 (m, 12H), 8.08 (bs, 1H).
120	3.11 (dd, 1H), 3.23 (dd, 1H), 4.13-4.28 (m, 2H), 5.97 (s, 1H), 7.25-7.75 (m, 12H), 7.90-8.00 (bs, 1H).
149	3.65 (d, 2H), 4.20 (t, 1H), 4.70 (s, 2H), 6.85 (dd, 1H), 6.93 (dd, 1H), 7.08 (dd, 1H), 7.15-7.21 (m, 3H), 7.24 (d, 2H), 7.40 (d, 2H), 8.13 (d, 2H), 8.40 (s, 1H).
150	3.64 (s, 2H), 4.69 (s, 2H), 6.84 (dd, 1H), 6.94 (dd, 1H), 7.09 (m, 3H), 7.23 (t, 1H), 7.29 (d, 2H), 7.40 (d, 2H), 8.12 (d, 2H), 8.40 (s, 1H).

The ant controller of the present invention exhibits a markedly high killing effect at a low dosage upon all the termites doing harm to houses, construction materials, furniture, leathers, fibers, vinyl articles, electric wires and cables, for example, RHINOTERMITIDAE including Coptotermes formosanus Shiraki, Reticulitermes speratus (Kolbe), Reticulitermes hesperus which inhabits the North America, Reticulitermes tibialis, Reticulitermes flavipes, Reticulitermes lucifugus which inhabits the shore of the Mediterranean, Reticulitermes santonensis, Incisitermes minor (Hagen), TERMITIDAE including Odontotermes formosanus (Shiraki), KALOTERMITIDAE including Cryptotermes domesticus (Haviland), TERMOPSIDAE including Hodotermopsis japonica (Holmgren), etc.

Further, the ant controller of the present invention exhibits a markedly high killing effect at a low dosage upon all the ants doing harm to crops, or to human being when the ants invade into houses and public facilities such as parks, for example, FORMICIDAE including Monomorium pharaonis Linne, Monomorium nipponeense Wheelex, Camponotus kiusiuensis Santschi, Formica japonica Motschulsky, Lasius fuliginosus (Latreille), Solenopsis richteri, Solenopsis invicta, Solenopsis geminata (Fireant), etc.

For using the ant controller of the present invention containing the hydrazine derivative of formula (I) as an active ingredient efficiently, the ant

5 controller is formulated with a proper solid carrier
and/or liquid carrier. If necessary, it is formulated
with auxiliaries in a proper proportion according to the
conventional recipe of formulation, and homogenized
together with the carrier by the method of dissolution,
10 suspension, mixing, impregnation, adsorption or
adhesion, so as to be made it into an appropriate
preparation form such as oily solution, emulsifiable
concentrate, solubilized concentrate, dust, granule,
wettable powder, aerosol, fumigant, flowable preparation
15 or the like. It is also possible to form the termite
controller into a bait preparation by compounding it
with a bait containing an attractant or the like.

As the solid carrier used in the present invention, there can be exemplified clays such as kaolin, bentonite, acid clay and the like; talcs such as talc, pyrophyllite and the like; silica materials such as diatomaceous earth, siliceous sand, mica, synthetic silicate, synthetic high-dispersion silica and the like; and inorganic mineral powders such as pumice, sand and the like; organic matters such as pieces of wood, chips of pulp wood, grain flour, sugars and the like. As the liquid carrier, there can be exemplified alcohols such as methyl alcohol, ethyl alcohol, ethylene glycol and the like; ketones such as acetone, methyl ethyl ketone, cyclohexanone and the like; ethers such as ethyl ether, dioxane, tetrahydrofuran, Cellosolves and the like; aliphatic hydrocarbons such as light oil, kerosene and

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5 the like; aromatic hydrocarbons such as benzene,
toluene, xylene, solvent naphtha, cyclohexanone,
methylnaphthalene and the like; and halogenated
hydrocarbons such as chloroform, carbon tetrachloride,
chlorobenzene and the like. These solid and liquid
10 carriers may be used either alone or in the form of a
mixture.

As the auxiliaries which can be used in the present invention, surfactants, dispersants, sticking agents, etc. can be referred to. As the surfactants, 15 there can be exemplified polyoxyethylene alkylaryl ethers, polyoxyethylene sorbitan monolaurates, alkylaryl sorbitan monolaurates, alkylbenzesulfonates, alkylnaphthalene-sulfonates, ligninsulfonates, higher alcohol sulfuric ester salts, etc. These surfactants 20 may be used either alone or in the form of a mixture.

As the dispersants or sticking agents, for example, casein, gelatin, starch, alginic acid, carboxymethyl cellulose, agar, polyvinyl alcohol, turpentine oil, etc. can be used according to the need.

25 The ant controller of the present invention is applied not only to the surrounding soil surface or into the under-floor soil in order to protect wooden materials such as trees, board fences, sleepers, etc. and structures such as shrines, temples, houses, 30 outhouses, factories, etc., but it can also be applied to lumbered articles such as surfaces of the under-floor concrete, alcove posts, beams, plywoods, furniture,

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5 etc., wooden articles such as particle boards, half boards, etc. and vinyl articles such as coated electric wires, vinyl sheets, heat insulating material such as styrene foams, etc. In case of application against ants doing harm to crops or human beings, the ant controller
10 of the present invention is applied to the crops or the surrounding soil, or is directly applied to the nest of ants or the like.

The present invention is not limited to the embodiments mentioned above, but it also includes the
15 embodiments of applying the ant controller of the invention preventively to places at which occurrence of ants is expected.

In putting the ant controller of the present invention, the dosage may be appropriately selected from
20 the ranges properly chosen. In case of application to wooden materials, the quantity of active ingredient ranges from 0.1 to 50 g per m²; and in case of soil treatment or application to the nests, the quantity of active ingredient ranges from 1 to 500 g per m².

25 EXAMPLES

Next, typical examples and test example of the present invention are presented below. The invention is by no means limited to these examples.

In the examples, "parts" are by weight.

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5 Formulation Example 1

Each hydrazine derivative listed

in Tables 1-4 20 parts

Xylene 80 parts

The ingredients mentioned above were made into
10 a uniform solution to obtain an oily solution.

Formulation Example 2

Each hydrazine derivative listed

in Tables 1-4 10 parts

Polyoxyethylene styrylphenyl ether 10 parts

15 Cyclohexanone 80 parts

The ingredients mentioned above were uniformly
mixed and dissolved together to obtain an emulsifiable
concentrate.

Formulation Example 3

20 Each hydrazine derivative listed

in Tables 1-4 10 parts

Sodium alkylbenzenesulfonate 2 parts

White carbon 10 parts

Clay 78 parts

25 The ingredients mentioned above were uniformly
mixed and pulverized to obtain a wettable powder.

Formulation Example 4

Each hydrazine derivative listed

in Tables 1-4 8 parts

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5 Cyclohexanone 4 parts
Mixture of polyoxyethylene nonylphenyl
ether and alkylbenzenesulfonic acid 3 parts
A granular composition was prepared by
uniformly mixing and dissolving together the ingredients
10 mentioned above, and spraying the resulting solution
onto 85 parts of granular pumice, followed by drying.

Test Example 1

A filter paper was spread in a glass dish
having a diameter of 9 cm, onto which was dropped 1 ml
15 of a 500 ppm solution of the ant controller of the
present invention. Then, the filter paper was
inoculated with Coptotermes formosanus Shiraki. Seven
days after the inoculation, percentage of dead insects
was investigated, from which mortality was calculated.
20 The results were evaluated according to the following
criterion. The test was carried out with triplicate
group of 10 insects.

Criterion	Mortality (%)
A	100
B	99-90
C	89-80
D	79-50

The results are summarized in Table 6.

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Table 6

Compound No.	Termite-killing effect	Compound No.	Termite-killing effect
1	A	5	A
2	B	6	A
3	A	7	A
4	A	8	C

10015461.00000000

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5 Table 6 (Cont'd)

Compound No.	Termite-killing effect	Compound No.	Termite-killing effect
9	B	32	A
10	A	33	C
11	A	34	A
12	A	35	A
13	A	36	B
14	A	37	A
15	B	38	B
16	C	39	A
17	A	40	D
18	A	41	A
19	A	42	A
20	A	43	A
21	A	44	C
22	B	45	A
23	A	46	A
24	C	47	A
25	D	48	A
26	A	49	C
27	A	50	A
28	C	51	A
29	C	52	A
30	A	53	B
31	A	54	A

5 Table 6 (Cont'd)

Compound No.	Termite-killing effect	Compound No.	Termite-killing effect
55	A	78	A
56	A	79	B
57	D	80	A
58	A	81	A
59	C	82	B
60	C	83	D
61	A	84	A
62	A	85	C
63	A	86	A
64	A	87	C
65	C	88	A
66	A	89	B
67	A	90	A
68	A	91	A
69	B	92	A
70	A	93	D
71	A	94	A
72	A	95	A
73	A	96	A
74	A	97	A
75	A	98	A
76	A	99	A
77	A	100	A

5 Table 6 (Cont'd)

Compound No.	Termite-killing effect	Compound No.	Termite-killing effect
101	A	124	D
102	A	125	A
103	A	126	A
104	A	127	A
105	B	128	A
106	A	129	A
107	D	130	C
108	C	131	C
109	C	132	A
110	B	133	A
111	D	134	A
112	A	135	B
113	A	136	A
114	B	137	A
115	A	138	A
116	B	139	A
117	A	140	A
118	D	141	D
119	A	142	C
120	A	143	C
121	C	144	B
122	D	145	A
123	A	146	D

5 Table 6 (Cont'd)

Compound No.	Termite-killing effect	Compound No.	Termite-killing effect
147	A	153	A
148	A	154	B
149	A	155	A
150	C	156	B
151	C	157	A
152	B	158	C

Test Example 2

The ant controller of the present invention
10 was applied to nests (anthill) of fireant (*Solenopsis geminata*) with drench treatment, in terms of 1 g of the active ingredient per one nest. 14 Days after the treatment of the ant controller, the activity of the nests was evaluated according to the following
15 criterion. The test was carried out with one block per one nest.

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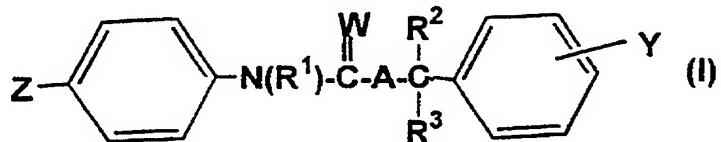
5	Criterion	Effect
	A	Nest is completely destructed or activity of the nest is extremely low.
	B	Activity of the nest is exhibited.
	C	High activity of the nest is exhibited.
10	D	Activity of the nest is extremely high.

As a result of the test, compound Nos. 44 and
96 of the present invention exhibited the effect "A".

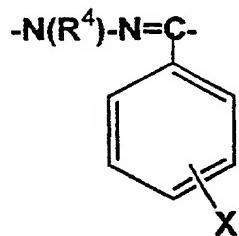
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WHAT IS CLAIMED IS:

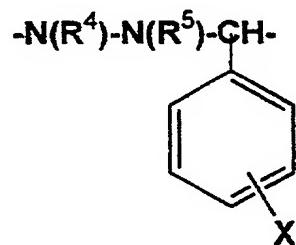
1. An ant controller characterized by containing, as active ingredient thereof, a hydrazine derivative represented by the following formula (I):



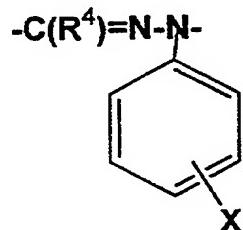
wherein A represents:



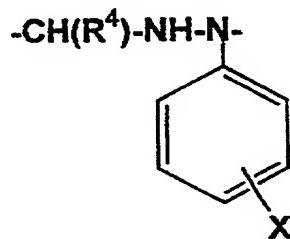
(wherein R⁴ represents hydrogen atom or C₁-C₆ alkyl group, and X represents 1 to 5, same or different substituents selected from the group consisting of hydrogen atom, halogen atom, C₁-C₆ alkyl group and halo C₁-C₆ alkyl group),



(wherein R⁴ and X are as defined above, and R⁵ represents hydrogen atom, C₁-C₆ alkylcarbonyl group or phenylcarbonyl group which may have 1 to 2, same or different substituents selected from the group consisting of C₁-C₆ alkyl groups),



(wherein R⁴ and X are as defined above), or



(wherein R⁴ and X are as defined above);

R¹ represents hydrogen atom or C₁-C₆ alkyl group;

R² and R³, which may be same or different, represent hydrogen atom, hydroxyl group, C₁-C₆ alkyl group, C₁-C₆ alkoxy group, C₁-C₆ alkylcarbonyl group or phenylcarbonyl group;

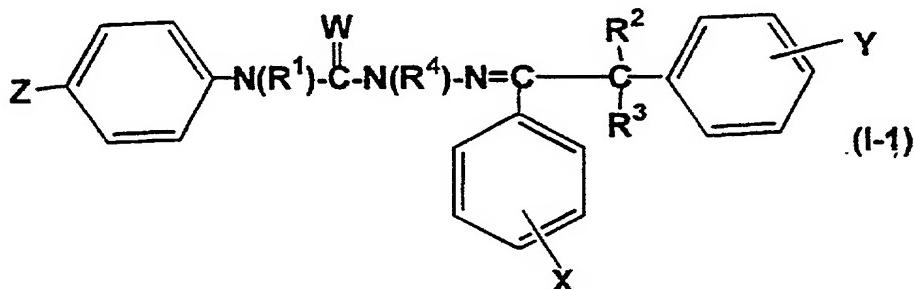
Y represents 1 to 5, same or different substituents selected from the group consisting of

hydrogen atom, halogen atom, nitro group and cyano group;

Z represents halogen atom, cyano group, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, halo C₁-C₆ alkylthio group, halo C₁-C₆ alkylsulfinyl group or halo C₁-C₆ alkylsulfonyl group; and

W represents oxygen atom or sulfur atom.

2. The ant controller according to Claim 1, which is represented by the following formula (I-1):



wherein R¹ represents hydrogen atom or C₁-C₆ alkyl group; R² and R³, which may be same or different, represent hydrogen atom, hydroxyl group, C₁-C₆ alkyl group, C₁-C₆ alkoxy group, C₁-C₆ alkylcarbonyl group or phenylcarbonyl group;

R⁴ represents hydrogen atom or C₁-C₆ alkyl group;

X represents 1 to 5, same or different substituents selected from the group consisting of hydrogen atom, halogen atom, C₁-C₆ alkyl group and halo C₁-C₆ alkyl group;

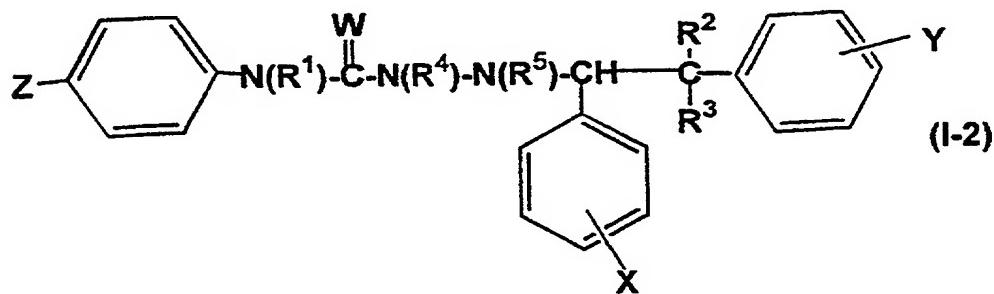
- 38 -

Y represents 1 to 5, same or different substituents selected from the group consisting of hydrogen atom, halogen atom, nitro group and cyano group;

Z represents halogen atom, cyano group, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, halo C₁-C₆ alkylthio group, halo C₁-C₆ alkylsulfinyl group or halo C₁-C₆ alkylsulfonyl group; and

W represents oxygen atom or sulfur atom.

3. The ant controller according to Claim 1, which is represented by the following formula (I-2):



wherein R¹ represents hydrogen atom or C₁-C₆ alkyl group; R² and R³, which may be same or different, represent hydrogen atom, hydroxyl group, C₁-C₆ alkyl group, C₁-C₆ alkoxy group, C₁-C₆ alkylcarbonyl group or phenylcarbonyl group;

R⁴ represents hydrogen atom or C₁-C₆ alkyl group;

R⁵ represents hydrogen atom, C₁-C₆ alkylcarbonyl group or phenylcarbonyl group which may

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have 1 to 2, same or different substituents selected from the group consisting of C₁-C₆ alkyl groups;

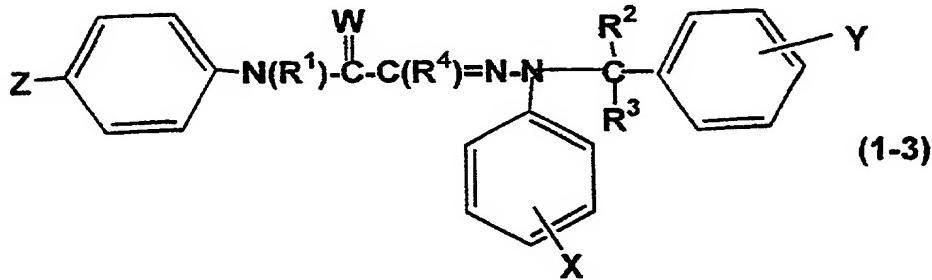
X represents 1 to 5, same or different substituents selected from the group consisting of hydrogen atom, halogen atom, C₁-C₆ alkyl group and halo C₁-C₆ alkyl group;

Y represents 1 to 5, same or different substituents selected from the group consisting of hydrogen atom, halogen atom, nitro group and cyano group;

Z represents halogen atom, cyano group, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, halo C₁-C₆ alkylthio group, halo C₁-C₆ alkylsulfinyl group or halo C₁-C₆ alkylsulfonyl group; and

W represents oxygen atom or sulfur atom.

4. The ant controller according to Claim 1, which is represented by the following formula (I-3):



wherein R¹ represents hydrogen atom or C₁-C₆ alkyl group;

R² and R³, which may be same or different, represent hydrogen atom, hydroxyl group, C₁-C₆ alkyl group, C₁-C₆ alkoxy group, C₁-C₆ alkylcarbonyl group or

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phenylcarbonyl group;

R^4 represents hydrogen atom or C_1-C_6 alkyl group;

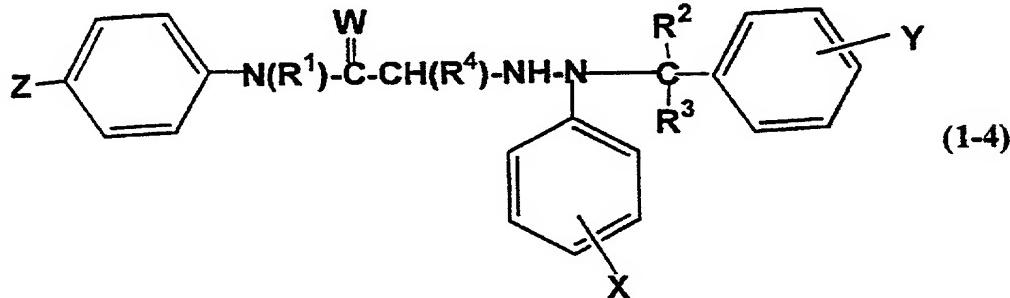
X represents 1 to 5, same or different substituents selected from the group consisting of hydrogen atom, halogen atom, C_1-C_6 alkyl group and halo C_1-C_6 alkyl group;

Y represents 1 to 5, same or different substituents selected from the group consisting of hydrogen atom, halogen atom, nitro group and cyano group;

Z represents halogen atom, cyano group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, halo C_1-C_6 alkylthio group, halo C_1-C_6 alkylsulfinyl group or halo C_1-C_6 alkylsulfonyl group; and

W represents oxygen atom or sulfur atom.

5. The ant controller according to Claim 1, which is represented by the following formula (I-4):



wherein R^1 represents hydrogen atom or C_1-C_6 alkyl group;

R^2 and R^3 , which may be same or different,

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represent hydrogen atom, hydroxyl group, C₁-C₆ alkyl group, C₁-C₆ alkoxy group, C₁-C₆ alkylcarbonyl group or phenylcarbonyl group;

R⁴ represents hydrogen atom or C₁-C₆ alkyl group;

X represents 1 to 5, same or different substituents selected from the group consisting of hydrogen atom, halogen atom, C₁-C₆ alkyl group and halo C₁-C₆ alkyl group;

Y represents 1 to 5, same or different substituents selected from the group consisting of hydrogen atom, halogen atom, nitro group and cyano group;

Z represents halogen atom, cyano group, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, halo C₁-C₆ alkylthio group, halo C₁-C₆ alkylsulfinyl group or halo C₁-C₆ alkylsulfonyl group; and

W represents oxygen atom or sulfur atom.

6. A method for application of an ant controller which comprises treating a wooden part and a surrounding soil where ants and termites live, with an effective quantity of the ant controller according to Claim 1.

7. The method for application of an ant controller according to Claim 6, wherein the hydrazine derivative represented by the general formula (I) is a hydrazine derivative claimed in any one of Claims 2 to 5.

**CLAIM FOR BENEFIT OF EARLIER U. S. / PCT APPLICATION(S)
UNDER 35 U. S. C. 120**

I hereby claim the benefit under Title 35, United States Code, § 120 of any United States application(s) or PCT international application(s) designating the United States of America that is / are listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in that / those prior application(s) in the manner provided by the first paragraph of Title 35, United States Code §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application(s) and the national or PCT international filing date of this application.

U. S. Application(s) (or PCT applications designating U. S.)

U. S. Application Serial No.	Filing Date	Status (pending, patented, abandoned)

RELATED FOREIGN APPLICATIONS

Related foreign applications, if any, filed in the name of the inventor(s) or the inventor(s) assigns more than twelve months before the filing of the subject application are as follows

Country	Application No.	Date of filing	Date of issue or publication

POWER OF ATTORNEY

I hereby appoint the following attorney(s) and agent(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected herewith:

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Randall L. Shoemaker	Reg. No. <u>43,118</u>
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each of the above attorney(s) and agent(s) to have full powers of substitution and revocation, and each and any attorney or agent so substituted to have full powers of substitution and revocation.

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Mount Olive, NJ 07828-1234

CLAIM FOR BENEFIT OF FOREIGN PRIORITY UNDER 35 U. S. C. §119

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United State of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed.

- No such applications have been filed.
- Such applications have been filed as follows

DETAILS OF FOREIGN APPLICATION FROM WHICH PRIORITY CLAIMED UNDER 35 U. S. C. §119

Country	Application No.	Date of filing	Date of issue or publication
Japan	H11(1999)-190671	05 July 1999	

DECLARATION

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Kazuhiko Takagi

NAME OF SOLE OR FIRST INVENTOR

Kazuhiko Takagi

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